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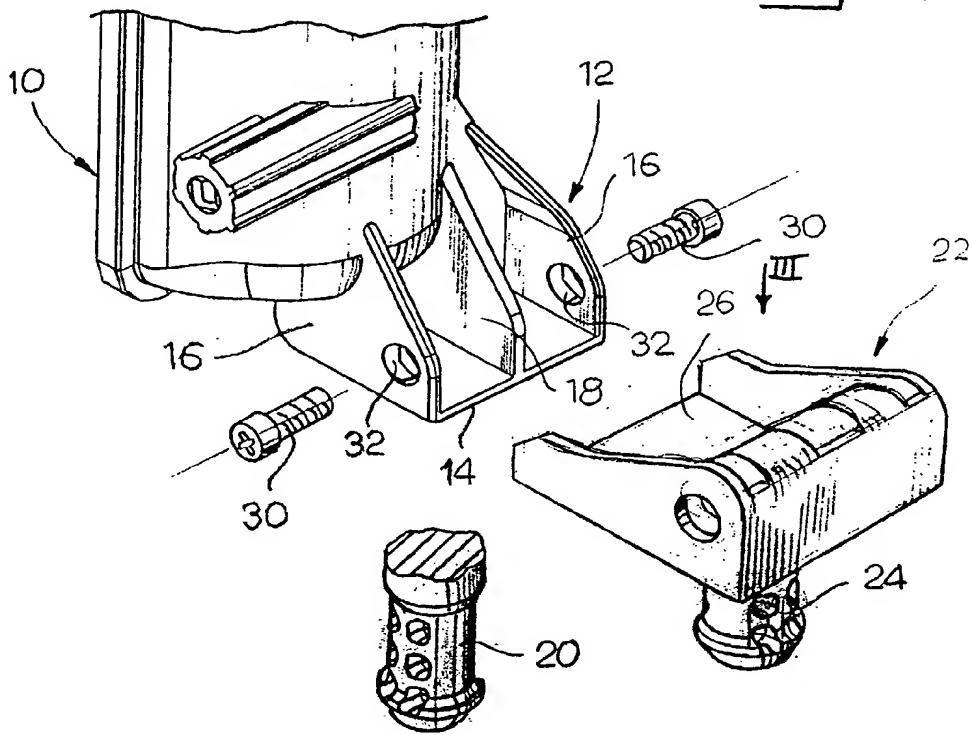
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(54) Radiator for vehicles with replaceable fixing pin

(57) A radiator for vehicles, comprising at least one collector tank or reservoir (10) made of plastic material which is provided with at least one projecting fixing pin

(20, 46) for fixing the radiator to the structure of the vehicle and means (12, 42) for fixing a spare component (22, 46) which replaces the aforesaid fixing pin (20, 46) in the event of failure of the latter.

Fig. 1



Description

[0001] The present invention relates to a radiator for vehicles, comprising at least one collector tank or reservoir made of plastic material which is provided with at least one projecting fixing pin for fixing the radiator to the structure of the vehicle.

[0002] The present applicant has found that the vehicles equipped with radiators of the type specified above are frequently subject to failure of the pin or pins for fixing the radiator in the event of frontal impact, even if the impact is of small degree and does not damage the heat-exchange core of the radiator. The said failure of the fixing pin entails the need to replace the entire radiator even if the remaining part of the radiator has remained substantially intact. There result therefrom high costs for repairs due both to the high cost of the component to be replaced (entire radiator) and to the need to empty out the cooling system in order to replace the radiator.

[0003] The purpose of the present invention is to provide a radiator of an improved type that makes it possible to overcome the aforesaid drawbacks.

[0004] According to the present invention, the above purpose is achieved by a radiator having the characteristics that form the subject of the annexed claims.

[0005] The present invention will now be described in detail with reference to the attached drawings, which are provided purely by way of non-limiting example and in which:

- Figure 1 is an exploded perspective view of the end part of a collector tank of a radiator according to the present invention;
- Figure 2 is a perspective view illustrating the part of the radiator of Figure 1 in an assembled condition;
- Figure 3 is a perspective view from a different angle of the component indicated by the arrow III in Figure 1;
- Figure 4 is a sectional view taken along the line IV-IV of Figure 2;
- Figure 5 is a sectional view taken along the line V-V of Figure 4;
- Figure 6 is a perspective view from below of a collector tank according to a second embodiment of the present invention;
- Figure 7 is a plan view according to the arrow VII of Figure 6;
- Figure 8 is a view according to the arrow VIII of Figure 6;
- Figure 9 is a perspective view of a pin designed to be mounted on the collector tank illustrated in Figures 6, 7 and 8; and
- Figure 10 is a partially sectioned side view illustrating the pin of Figure 9 mounted on the corresponding seat of the collector tank.

[0006] With reference to Figures 1 to 5, the number 10 designates a collector tank or reservoir made of plas-

tic material of a radiator (not illustrated) for vehicles. The collector tank 10 has, at one of its ends, an integral bracket 12 which comprises a bottom wall 14 and is connected to the body of the tank 10 by means of two side walls 16 and a central wall 18, all the aforesaid walls being formed integrally by moulding with the body of the tank 10. A fixing pin 20 is formed integrally with the bracket 12 and protrudes downwards from the bottom wall 14. Figure 1 illustrates the condition in which the

pin 20 has been separated from the bracket 12 after the pin broken. Experience shows that failure of the pin 20 caused by a frontal impact of the vehicle always takes place in the proximity of the base of the pin because the maximum bending and shearing stresses caused by the impact concentrate in this area.

[0007] According to the present invention, following upon an impact that leads to failure of the pin 20 formed integrally with the tank 10 (without, however damaging the heat-exchange core of the radiator), functionality of

the radiator is restored by fixing, on the bracket 12, an auxiliary member 22 provided with an integral pin 24 which, in the fixing position of the auxiliary member 22, substantially assumes the same position as the original pin 20. The auxiliary member 22 comprises a bottom wall 26 which is set facing the bottom wall 14 of the bracket 12, and a pair of side walls 28 which are set laterally on the outside of the side walls 16 of the bracket 12. Preferably, the auxiliary member 22 is fixed to the bracket 12 by means of a pair of screws 30 which extend through respective holes 32, 34 formed, respectively, in the side walls 16, 28. The auxiliary member 22 is preferably equipped with a pair of integral blocks 36 provided with holes 38 inside which threaded portions of the screws engage.

[0008] Figures 6 to 10 illustrate a second embodiment of the present invention. In this variant, the tank 10 has an integral base 40 on which a hooking seat 42 is formed which consists of a projecting element provided with an undercut groove 44. A pin 46 is formed as a component separate from the tank 10 and is provided with elastically deformable teeth 48 which engage by snap action the undercut groove 44 of the hooking portion 42. The pin 46 is provided with a restricted section 50 which constitutes a point of initiation of failure in the event of stresses due to impact. In the event of failure of the pin 46, the root portion of the pin that remains anchored to the tank is removed, and a new pin 46 is inserted onto the hooking portion 42.

[0009] In both embodiments, the fixing pin which has broken following upon an impact can be replaced without having to remove the radiator and without having to empty out the cooling system of the vehicle. The costs for repairs are thus far lower than those for the prior solutions in which, following upon failure of the pin, it is necessary to replace the entire radiator.

Claims

1. A radiator for vehicles, comprising at least one collector tank or reservoir (10) made of plastic material which is provided with at least one projecting fixing pin (20, 46) for fixing the radiator to the structure of the vehicle, **characterized in that** it comprises means (12, 42) for fixing a spare component (22, 46) which replaces the aforesaid fixing pin (20, 46) in the event of failure of the latter. 5
2. The radiator according to Claim 1, **characterized in that** the aforesaid spare component (22) comprises a base (26) provided with an integral pin (24) and means (28, 34, 36) for its fixing to a bracket (12) formed integrally with the aforesaid collector tank (10). 15
3. The radiator according to Claim 1, **characterized in that** the aforesaid spare component comprises a pin (46) provided with snap-action hooking teeth (48) designed to engage a hooking seat (42) formed integrally with the collector tank (10). 20

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Fig. 1

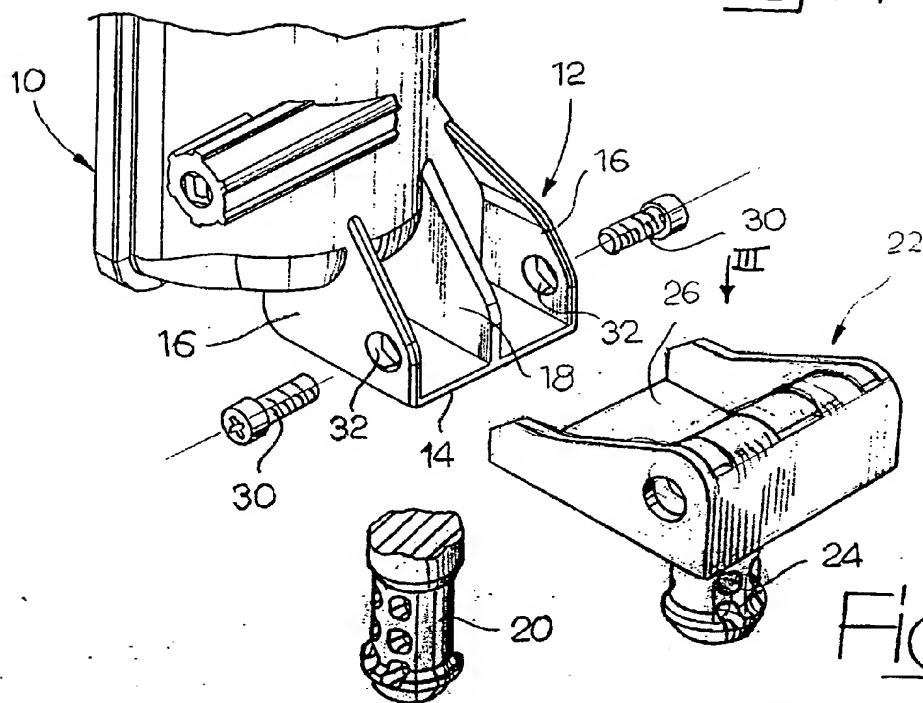


Fig. 3

Fig. 2

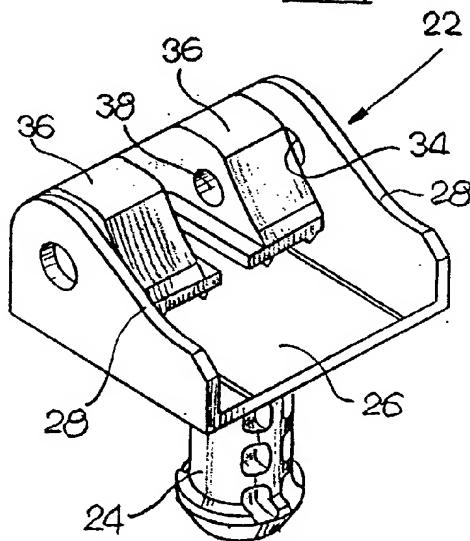
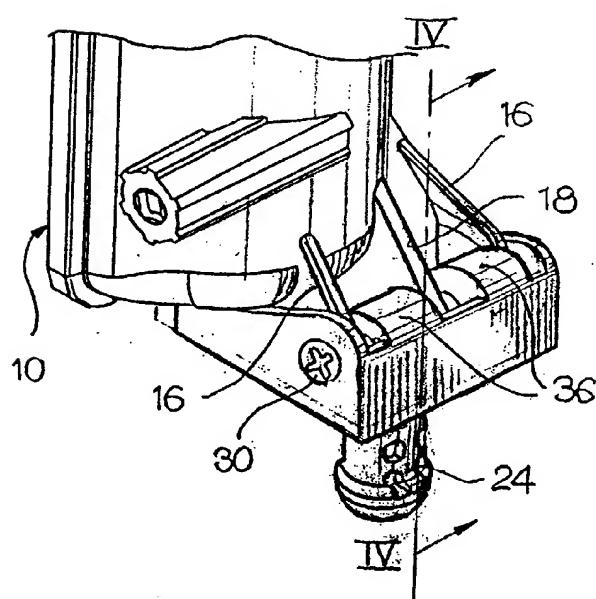


Fig. 4

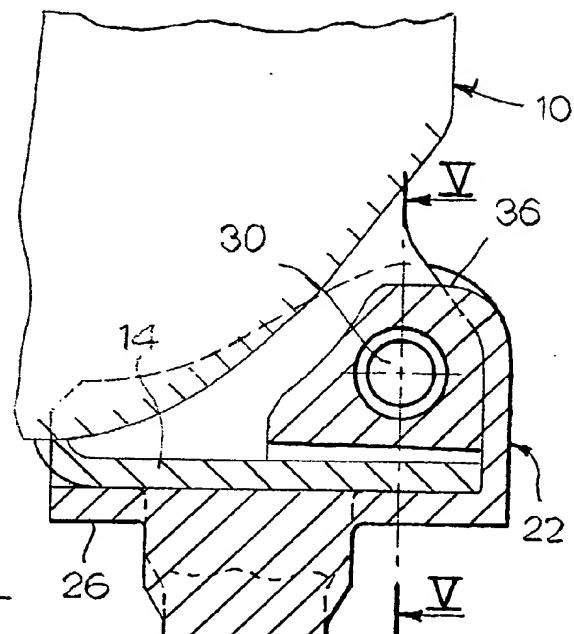


Fig. 5

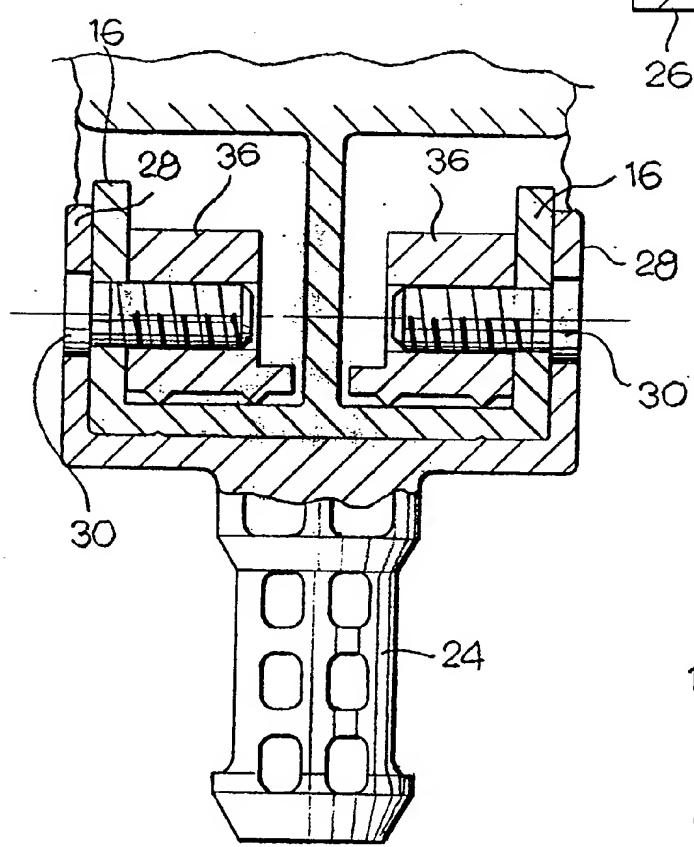
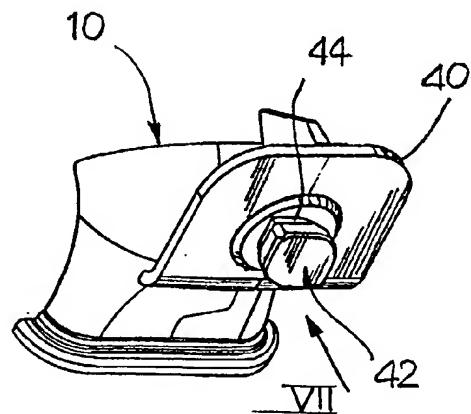


Fig. 6



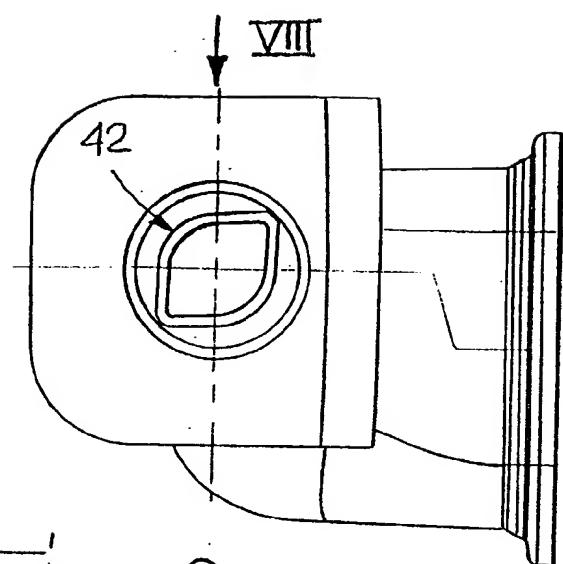


Fig. 8

Fig. 7

Fig. 9

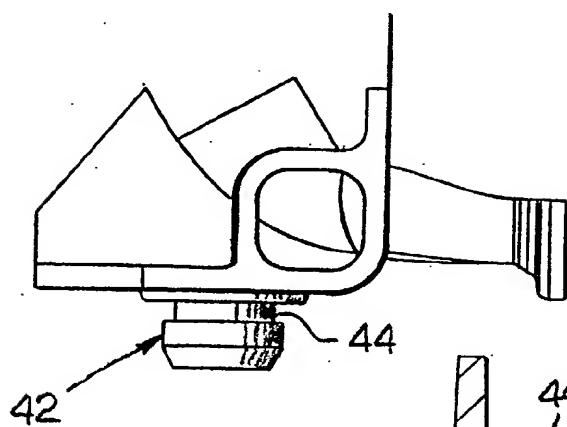
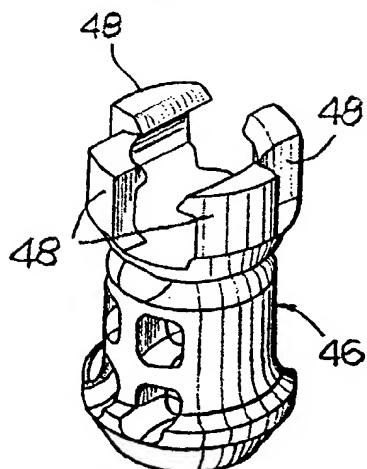
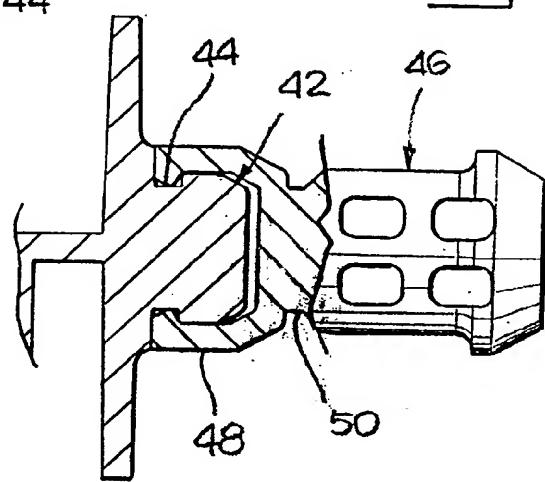


Fig. 10





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EUROPEAN SEARCH REPORT

Application Number
EP 01 12 5196

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS
SEARCHED (Int.Cl.7)

B60K
F28F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	5 February 2002	Krieger, P
CATEGORY OF CITED DOCUMENTS		
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 12 5196

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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